

BRIDGE MANUAL CHAPTER 48 – ELECTRICAL GROUNDING OF STRUCTURES

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48.1 INTRODUCTION

- | The purpose for grounding structures electrically is to provide maximum safety for persons in the vicinity of structures by limiting step and touch potentials. Also, electrical grounding limits the ground potential rise due to lightning strikes on structures by providing a low resistance path to remote earth.

- | No references to lightning protection are found in the AASHTO Specifications
| except for Movable Highway Bridges. However, lightning protection design should
| consider structure location, potential high-incident lightning areas and the
| structure's risk to lightning damage to either the structure or structure electrical
| systems or potential occupants.

- | Electrical grounding may be considered for all structures with pedestrian facilities
| where chainlink fencing, steel girders, railing and lighting is detailed and new steel
| structures which are more than 50 feet above water.

- | When required, an electrical grounding note is to be provided with construction
| plans, taken from Figure 48.2.

48.2 METHOD

| Electrical grounding shall be accomplished by external grounding techniques for both existing and new structures at abutments. Additional electrical grounding details should be provided on tied arches or trusses at their piers.

| A bare copper stranded, single conductor, with an American wire gage size of 4/0 shall be installed under the deck. This shall be attached to the end of a steel girder by exothermically welding and as well as to the abutment as deemed necessary by UL listed cable fasteners spaced per manufacturer's recommendations. If the wire is placed in concrete, it shall be protected with nonferrous conduit.

| Grounding shall be accomplished by attaching the copper wires to abutment piles by exothermically welding for new structures or to copperclad grounding electrodes by exothermically welding for existing structures. The grounding electrodes shall be in compliance with the latest Underwriters Laboratory Specification 467 and American National Standards Institute Specification C-338. Reference may be made to Figure 48.2 for electrical grounding details and specifications.

| When protecting lightning system conductors in conduit, only nonferrous conduits should be used. The magnetic properties of steel behave as a magnetic choke and raise the impedance of the conductor to unacceptably high values.

| All electrical ground circuitry shall be field tested for electrical continuity. A ground resistance tester shall be used to verify ground resistance in accordance with the National Electrical Code.

| The proper exothermic mold and associated equipment shall be used for each connection. All materials used such as molds, weld material, accessories, and tools shall be supplied by one manufacturer to ensure compatibility.

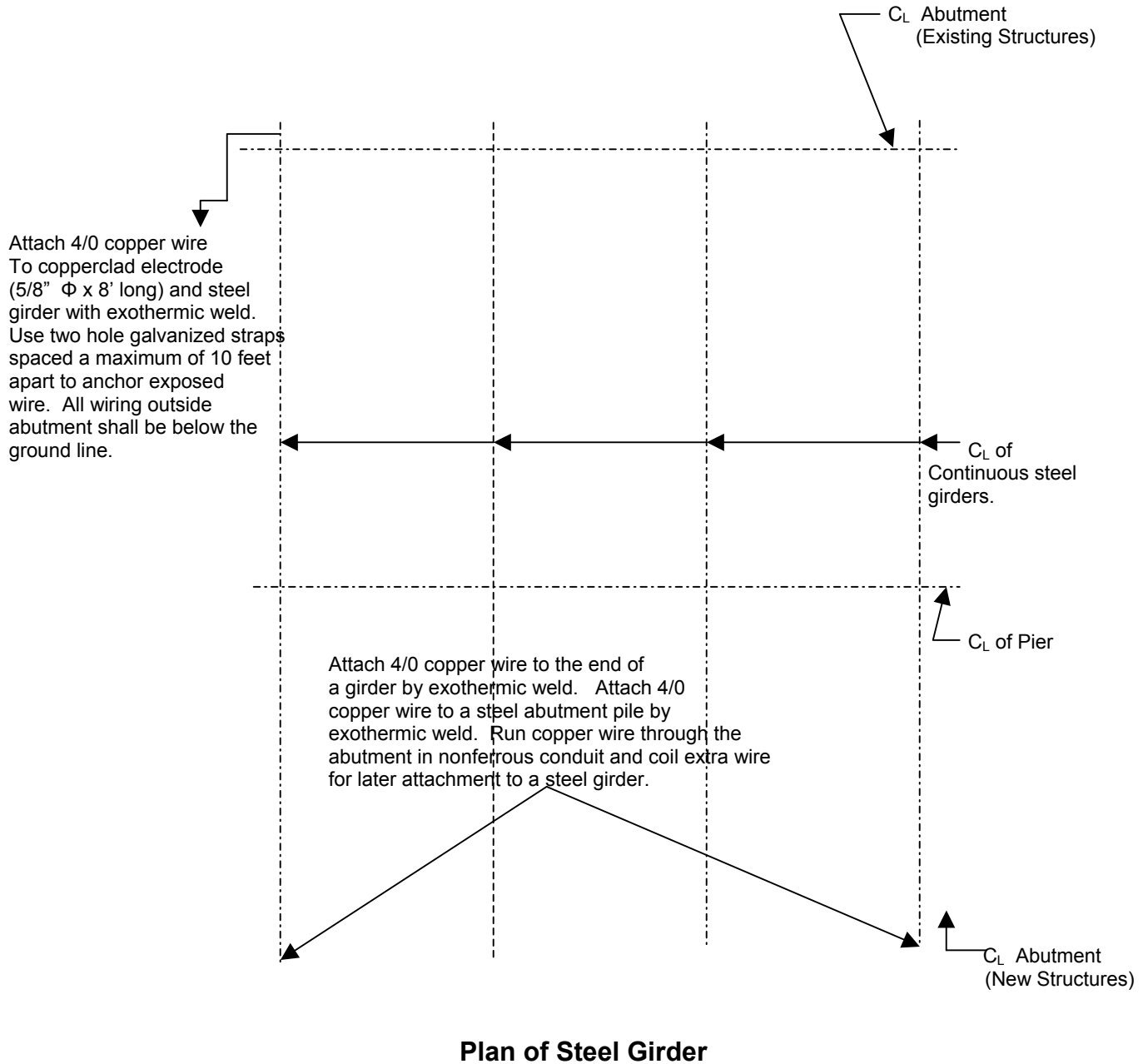


FIGURE 48.2